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| 10/586,956 | 07/25/2006 | Tomoharu Horio | 10921.421USWO | 3401 |
| 52835 7590 03/09/2009 HAMRE, SCHUMANN, MUELLER & LARSON, P.C. P.O. BOX 2902 MINNEAPOLIS, MN 55402-0902 | | | | |
| EXAMINER | | | | |
| LIU, LI | | | | |
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| 2613 | | | | |
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/586,956

Applicant(s)

HORIO ET AL.

Examiner

LI LIU

Art Unit

2613

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 July 2006 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/ISD)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date 7/25/2006

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement (IDS) submitted on 7/25/2006 is being considered by the examiner.

Drawings

2. Figure 9 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because of the following informalities: page 1, line 16, "Fig. 8" should be changed to "Fig. 9".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Karauchi (JP10-321900, English machine-translation of JP10-321900) in view of Maeno (JP2001-168376, English machine-translation of JP2001-168376).

1). With regard to claim 1, Karauchi discloses an optical communication module (e.g., Figures 1-4) comprising:

a substrate (the lead frame substrate 10 in Figure 1-4, [0008] and [0019]);

a light emitting element (the light emitting element LD in Figures 1-4) and a light receiving element (the light receiving element PD in Figures 1-4) mounted on the substrate (the LD and PD mounted on the lead frame substrate 10, [0008] and [0019]);
and

a sealing resin member (the resin 12 in Figures 1-4) that is transparent to light emitted from the light emitting element ([0008], [0009], [0013], [0019] and [0021], the resin is transparent to the light from the light emitting element) and covers both the light emitting element and the light receiving element (the resin 12 covers the LD and PD);

the sealing resin member being formed with a lens facing the light emitting element (Figures 1-4, the sealing resin forms a lens 14 facing the light emitting element LD);

the sealing resin member being further formed with an inclined surface (e.g., the inclined surface 18 in Figures 1 and 3) that is adjacent to the lens (the lens 14 in Figures 1 and 3) and inclined with respect to both a first direction in which the light emitting element and the light receiving element are arranged side by side (Figures 1 and 3, the inclined surface is inclined with respect to the direction: LD<->PD) and a second direction extending from the light emitting element to the lens (Figures 1 and 3, the inclined surface is also inclined with respect to the direction from LD to the lens 14);

the light receiving element (the PD in Figures 1 and 3) being arranged to receive light reflected.

Karauchi uses the light receiving element for monitoring. But, Karauchi does not expressly disclose that the light receiving element being arranged to receive light refracted in passing through the inclined surface.

However, to use a photo detector with the light transmitting device to form the transceiver is known in the art. Maeno teaches an optical transceiver module in which the light emitting element (12 in Figure 1-4 and 6) and light receiving element (the photodetector 13 in Figure 1-4 and 6) are mounted on a substrate, and the resin 16 covers the light emitting element and light receiving element. The light receiving element (photodetector 13) is used for receiving and detecting infrared light (the light emitting element and light receiving element form an infrared communication module, [0002] and [0032]) refracted in passing through the resin surface.

By using the light receiving element of Karauchi to detect the incoming signals, instead of monitoring, as taught by Maeno, a bidirectional communication can be formed. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the photodetector to receive the incoming signal as taught by Maeno in the system of Maeno and the inclined surface to refract the incoming light to the photodetector (as shown in the following Figure O1), and then a compact bidirectional optical transmission module (Figure O1) can be obtained.

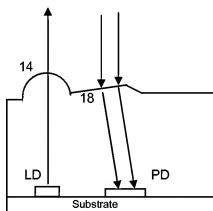


Figure O1

2). With regard to claim 2, Karauchi and Maeno disclose all of the subject matter as applied to claim 1 above. And as shown in Figure 3, Karauchi teaches that the inclined surface is inclined in the first direction so that the inclined surface becomes farther from the substrate as proceeding away from the lens (Figure 3 of Karauchi, or the Figure O1 above, the inclined surface 18 becomes farther from the substrate as proceeding away from the lens 14).

But Karauchi and Maeno do not expressly disclose wherein the inclined surface is inclined in the first direction so that the inclined surface becomes closer to the substrate as proceeding away from the lens.

Figure 3 of Karauchi

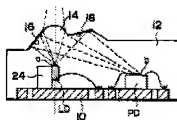
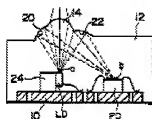


Figure 4 of Karauchi



However, as shown in Figure 4, Karauchi teaches a concave curve surface (22 in Figure 4) that reflects the light to the photodiode, and the surface becomes closer to the substrate as proceeding away from the lens. As shown in Figure 3 and Figure 4, the distance between the LD and PD in Figure 4 is shorter than the distance between the LD and PD in Figure 3. That is, how the surface is inclined depends on the distance between the LD and PD: when the PD is far away from the LD, the inclined surface should be farther from the substrate as proceeding away from the lens, and when the PD is near to the LD, the inclined surface should be closer to the substrate as proceeding away from the lens, so that the light can be properly projected to the photodiode.

And Maeno also teaches that to miniature the infrared communication module, the distance between the transmitter and receiver needs to be made “minimum” or “shorten” ([0005]-[0008] and [0039]).

By using the inclined surface that becomes closer to the substrate as proceeding away from the lens, the distance between the light emitting device and the photodetector can be shorten, and a miniaturized data communication module can be obtained.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the inclined surface that becomes closer to the substrate as proceeding away from the lens to the system of Karauchi and Maeno so that a miniaturized data communication module can be obtained (as shown in following Figure O2, the size of the transceiver module can be made smaller than that shown in Figure O1).

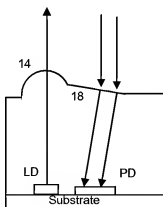


Figure O2

3). With regard to claim 3, Karauchi and Maeno disclose all of the subject matter as applied to claims 1 and 2 above. And, the combination of Karauchi further discloses wherein the inclined surface is entirely or partially curved convexly as viewed in the first direction (as shown in Figures 2 and 4 of Karauchi, the surface 22 is a concave “circularly” reflecting surface, [0016]-[0018], as viewed in the direction LD->PD, the inclined surface is curved convexly. Figure Q3 shows the view direction).

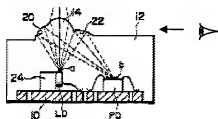


Figure O3

4). With regard to claim 4, Karauchi and Maeno disclose all of the subject matter as applied to claim 1 above, and Karauchi and Maeno further disclose wherein the inclined surface is inclined in the first direction so that the inclined surface becomes farther from the substrate as proceeding away from the lens (as shown in Figure 3 of Karauchi, or the Figure O1 above, the inclined surface 18 becomes farther from the substrate as proceeding away from the lens 14).

5). With regard to claim 5, Karauchi and Maeno disclose all of the subject matter as applied to claim 1 above, and Karauchi and Maeno further disclose wherein the lens projects in a direction to become farther from the substrate than the inclined surface is (e.g., Figures 3 and 4 of Karauchi, or the Figure O1 above, the distance between the lens center and the substrate is longer than the distance between the surface 18 or 22

to the substrate; that is, the lens projects in the direction, which is from the LD to the lens 14, to become farther from the substrate than the inclined surface is).

6). With regard to claim 6, Karauchi and Maeno disclose all of the subject matter as applied to claim 1 above, and Karauchi and Maeno further disclose wherein the light emitting element emits infrared light, whereas the light receiving element receives and detects the infrared light (Maeno: the system is used for infrared communication, the light emitting element is the infrared LED, and the light receiving element receives and detects the infrared light; Abstract, [0007], [0008], [0012] and [0018] etc.).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shimonaka (US 6,970,489) (a transceiver module);

Ishihara et al (US 2003/0002822) (inclined surfaces to refract light);

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LI LIU whose telephone number is (571)270-1084. The examiner can normally be reached on Monday-Friday, 8:30 am - 6:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571)272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Li Liu/
Examiner, Art Unit 2613
March 1, 2009